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SOME PROBLEMS OF PROGRESS

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I

PROGRESS is the controlling idea of western civilization. The man on the street discusses it as much as the philosopher. The most reactionary claims it no less than the radical. It has its place in the campaign material of the politician and comes into the exhortations of the preacher. In fact it is the most widely accepted doctrine of the present day. Yet the state of progress is an accomplished fact only in one of the great divisions of human activity, that is, in science. In the fields of economics and government, for instance, it is only a hope and an expectation. I am not using the term progress in the sense of a sequence of events, not as the state implied by "we don't know where we are going, but we are on our way." I am using it to denote a state of continuous advance with ever increasing rapidity toward an ideal yet definite goal.

The state of change in the field of government or of economics can not be called progressive in the above sense of the term. Great changes have taken place in these fields during the last 150 years, but their character has been impulsive and intermittent, accompanied with backward and forward oscillations. The political history of France from the revolution to the present day is a case in point. Even the history of this country during the same period is no exception. Although reactions comparable with those in France have not occurred in this country, it must be admitted that two of the three great steps towards an ideal of democracy were the result of revolution and of war. The third great step, the extension of suffrage to women, was accomplished by peaceful means, but as a setback we have the constant weakening of the actual if not the theoretical power of the citizen as a voter, which has been going on during the last one hundred years as a result of superficial expansion of democracy without commensurate growth in depth. The lack of simultaneous development of democracy along other lines—principally along economic lines—has introduced into the body politic forces and machinery which have made the franchise as meaningless to the average citizen as the right of a small stockholder to vote in the affairs of a large stock company. The

extension of Hobson's choice by our two-party system is counter-balanced, it is needless to say, by the practical identity of the aims and methods of the major parties.

If we consider any actual event as a necessary and inevitable link in the chain of history, then the present is in advance of the past whatever the character of the present state. Even a long swing backward along the road is a forward stretch if it is unavoidable. If we do not take this fatalistic view, however, it becomes debatable whether we have advanced far, if at all, during the last hundred years in the totality of our theory and practice of democracy, social and economic, as well as political.

The intermittent method of advance in the fields of economics and politics has, in the past, been destructive of wealth, of human lives, of happiness. It has given rise to suppression, revolution and war. It has aroused intense hatred between classes and races. It has produced the misery of filthy slums, on the one hand, and the debauchery of irresponsible wealth, on the other. If this method has been ruinous in the past, it may become fatal, at least to western civilization, if persisted in in the future. This is the supreme lesson to be learned from the last war and from the developments of instruments of destruction. Western civilization is at the parting of the way. It may follow its predecessors in the path of destruction or it may strike out into the new path blazed by science.

The idea of progress is less than three centuries old. It did not become a generally accepted principle until after the middle of the nineteenth century, and even then only in the western world. Its late appearance in the history of civilization is due to the world-wide misconceptions, incompatible with the idea of progress, which prevailed in the past with regard to the origin and destiny of the human race and of its habitat. The Ancient Greeks believed in the cycle theory of civilization. History repeated itself in a series of cycles. Nothing was, or could be, new under the sun. On the other hand, the Christians have followed the Hebrews and earlier oriental peoples in believing in the initial degeneration theory, according to which man and his world were created perfect only a few thousand years ago, but on account of "man's first disobedience" and fall his race and his world were condemned to a relatively short and miserable existence and to a final destruction, except for a chosen few who were to be saved from the wreckage of mankind.

There is no room for the idea of progress in either of these theories. Therefore a reasonable doubt as to their validity was necessary for the birth of the idea, and a more or less complete

overthrow of the theories for its growth and general acceptance. This was accomplished by science. It showed that man has evolved from lower stages of animal life to his present position during a series of geologic periods of immense duration, and that he is likely to exist on the earth for unnumbered generations to come without fear of the world coming to a sudden end. Furthermore, science demonstrated that with his present biological heritage it is possible for man to take great strides with ever increasing rapidity toward understanding nature, formulating her laws, directing her forces and applying them to life. In short, science made it possible for man to cast aside his gloomy outlook of life and his attitude of helplessness, and to take the destinies of his race into his own hands.

But if man is really to control his destiny the state of progress must be more than a hope and an expectation in all of the major fields of human activity. The research spirit, the unbiased critical mind and the experimental method of the scientist must prevail in the fields of politics and economics as well as in science.

But are not the problems of government and of industry very unlike those of science and far more difficult? Nobody can deny the great difference between the problems, but any problem, if it is to be solved, must be analyzed, formulated and eventually solved by the human mind. The general line of approach must, therefore, conform to the fundamental laws of operation of the mind. There is no reason, theoretical or experimental, why the scientific method which has proved equally successful in such varied subjects as astronomy and biology should not yield great results in the fields of government and economics. As to the relative difficulty of the problems no useful purpose is served by a blanket admission, or denial, unless it is followed by a careful analysis of the causes which contribute to the difficulties. It is safe to assert, however, that the greater the difficulty the more forceful is the reason for applying the only general method which has proved to be invariably successful.

II

My object is to point out some of the prevalent theories which are blocking progress in the fields of government and economics (at least as they appear to one scientist), to indicate some of the lessons which we could learn from the history of science, and to outline a plan by which the scientific method might be applied in these fields.

Tradition has been the most formidable enemy of progress in all ages and in every field. Disguised in the latest and most popular fashions it has always worked to arrest progress or to misguide. In the semblance of the guardian of souls, as the custodian of

public morals and safety, in the guises of patriotism, of authority, of loyalty and in many other more or less reasonable attires, it has played havoc with human intelligence. It has been driven out of the domain of science, but in the fields of government, economics and religion it still holds its own. We have heard so much about the conflict of science and religion and so little of any conflict between science and politico-economics. Yet there exists a real conflict between science and the rest, not so much because of differences on specific questions, such as the origin of the world, but because of the incompatibility of tradition with scientific spirit.

Only three centuries ago tradition ruled supreme in science. For two thousand years the western world had looked back with eyes fixed on Aristotle, producing a hypnotic state which made progress wellnigh impossible. Galileo broke the spell by a single crucial experiment. For centuries the world has been taught by tradition that heavier bodies fall faster than light ones. Galileo took a number of balls of different weight to the top of the leaning tower of Pisa and by dropping them showed that they all fell at the same rate. The effect of this simple experiment was startling. It established once for all the experimental method as the supreme test for truth in science.

It is interesting to note in this connection the state of mind which tradition creates. The learned professors of the university of Pisa would not believe their eyes. "Does he think," they said, "that by such experiments he can shake our belief in the true philosophy which teaches us that a hundred-pound ball falls one hundred times faster than a one-pound ball? Such disregard of authority is dangerous." In the light of three hundred years of scientific progress these men appear ridiculous to us. Could we see ourselves in the light of a commensurate progress in politics and economics we might be given to greater charity.

One of the obstacles in the way of progress in economics and government is the prevalent conception of the function of a natural law. As an illustration, consider the statement "the laws of economics are just as immutable as the law of gravitation," which is often used as an argument against any change in our economic organization. To the scientist no law is immutable. However exact our laws may be, they are subject to future revision and extension. Einstein's modification of the law of gravitation is a new evidence of the soundness of this position. The real aim of those who argue the immutability of economic laws, however, is to imply that attempts to alter the conditions under which these laws operate amount to attempting to change or to suspend the laws themselves and consequently are doomed to failure. This is about as sensible as

telling a hydro-electric engineer who is building a canal to divert the waters of a river that he is attempting to suspend gravitation. The law of gravitation operates whatever the condition under which water is made to flow. Similarly the law of demand and supply, for instance, operates under all economic conditions. Whether or not its operation under certain conditions is more conducive to progress than under certain other conditions depends upon the conditions. This question can only be decided by a comparative study of the actual operation of the law under the two conditions and not by arguments regarding the immutability of the law.

Let us take another illustration, this time from the field of government. Chief Justice Taft said in a recent decision, "The Constitution was intended, its very purpose was, to prevent experimentation with the fundamental rights of the individual." I suppose this interpretation is historically correct and justified. The framers of the Constitution were very much impressed by the encroachments on the most elementary rights of the individual by Kings and other government functionaries in the past and wanted to guard against such possibilities in the future by constitutional guarantees. But the problem in this connection has become rather a question of adjustment of the rights of individuals than one of safeguarding them. The time has come therefore to take the position that our conception of individual rights is in the process of growth, that conscious experimentation is one of the factors which should contribute to this growth, and that the constitution should become a guide for and not a barrier against such experimentation.

Again there is a widespread feeling that certain fundamental conditions necessary for progress in government and economics are lacking. This feeling is often expressed by the statements "You can not change human nature" and "change of heart must come first." But are these conditions necessary? Science has shown conclusively that they are not. It is fortunate indeed that they are not. For if progress were conditioned by a change in the nature or in the emotions of man all hope for progress would vanish into thin air. Human nature has not changed appreciably since the stone age. The vast amount of effort expended during historical time with the explicit object of affecting a change of heart has produced notoriously little result. These conditions are neither necessary nor attainable within a reasonable length of time.

There is a condition, however, which is both necessary and within striking distance, that is a change in the environment, in the atmosphere, in which human nature functions. The civilized gentleman of to-day behaves differently from his ancestors of the

neolithic age because the environment has changed and not because of a change in human nature. The soldier in action with his trench knife in a German dug-out of the western front is not a wild boar using his tusks. He is the same man whom you and I used to know as a fine young man. He has had no change of heart. The stimuli have changed, that's all.

The importance for the future of mankind of a clear understanding of this point can not be exaggerated. By focusing attention upon the improvement of the environment in which his nature functions and upon changing the stimuli which actuate his motives and impel his passions man may achieve in the next four centuries the results which he has vainly striven for during the last forty centuries by trying to change the human heart.

A number of biologists have warned the people of this country of a grave danger which is threatening to lower the hereditary qualities of the American people. They claim with good reason that civilization has upset the processes of natural selection. If this warning is to produce the desired result, however, it must not shift the main emphasis from the improvement of environment to questions of biological selection. The surest and shortest course to the improvement of our biological heritage lies through the betterment of the conditions which make progress possible. We can not afford to confound evolution with progress.

Another fallacy which has impeded progress in all ages is the bugaboo of the danger lurking in the person of the radical. Now, what constitutes a radical? Is he really dangerous in the sense that the general public is made to understand it? In order to obtain answers to these questions which will be free from the prejudices due to the *mores* of any one land or of any one age, we must make a critical study of the history of the radical in all lands and in all ages. If we do this we find, first, that the radical has generally been a man of ideals. His ideals have not always been very high nor his ideas very practical; yet it must be admitted that his radicalism has centered around ideas and ideals. Secondly, that most of the great reformers in religion, in politics, in science (until recently), and, in fact, in all important phases of life have been accused of dangerous radicalism by their contemporaries. Thirdly, that the radical of history has proved to be infinitely less dangerous than the ambitious or the greedy. If there is one supreme lesson to be learned from history, it is the fact that personal ambitions rather than ideas have proved to be disastrous to civilization.

Go through your ancient and modern history and count the number of wars, for instance, which you can conscientiously lay at the door of the radical, and then remember that the innoxious conservative had his share in the few revolutions for which the

radical of history has been responsible. It is decidedly unfair to deprive King George the Third of a small share in the glory of the American war of revolution. It would be interesting and instructive to speculate on the course which the history of the world might have taken had the radicals of Germany in 1848 and those of Russia in the sixties succeeded. Would Carl Schurtz and his friends have proved to be as dangerous as Bismarck and the ex-Kaiser, or Chaikowsky and his "circle" as destructive as the late Czar and his entourage?

One of the most potent factors which has contributed to progress in science is the habit of the scientist to draw general conclusions from carefully considered specific data. This is called the inductive method of science. After finding that two apples plus two apples make four apples and that this rule holds true for rabbits and a number of other objects he arrives at the conclusion that the rule holds for all objects. If a child had to learn the addition of each type of objects separately how fast and how far could it progress? Yet man has behaved when confronted with a new idea like such a child, especially when the new idea happened to concern his dominant interest. When philosophy was the dominant interest in Greece Socrates was accused and condemned for "corrupting the youth." At a time when religion was all important in Judea the custodians of public morals arraigned Jesus before Pilate with the charge "We found this fellow perverting the nation." When tradition and authority of the church were considered of supreme import Galileo was sentenced to death for "disregard of authority." "Heresy," "sedition" and "disloyalty" have been the magic words in all history which have set the hangman's noose into action.

We have learned to tolerate differences of opinion on matters of religion, to take a sympathetic attitude toward political refugees from other countries, and even to welcome new ideas in science. But when it comes to questions of economics and industry we draw the line. We discuss the French revolution with equanimity. A mere reference to the American revolution fills us with pride. But when it comes to the Russian revolution the situation is completely changed. We can not see any good in it. We don't want to see anything good come out of it. Questions of transmission of religious control and of political power through heredity do not excite us for we have never believed in khalifates and have settled the question of the divine right of kings. But we can not consider with composure questions of transmission of economic power through inheritance.

This is an age in which economic questions and problems of government affecting economic conditions form the sacred grounds

where one must not trespass. Yet absolute freedom of discussion is far more necessary for progress in economics and government than in science. The scientist can usually put his theoretical solution to the test of experiment. He can often build a model to demonstrate that his solution is practicable. The student of economics and of government is less fortunate. To be conclusive the experiments in his field have to be carried out on a vast scale in the laboratory of life, over which he has little or no control. The economist who works out a solution for the problem of the most efficient organization and operation of the railroads of this country can not build a model of the country with Belascovian detail and show the skeptic that his solution is workable. On account of this handicap, the widest possible opportunity should be open for free discussion of actual as well as proposed solutions of political and economic problems. This is the absolute minimum necessary for any possibility of progress in these fields without recourse to revolution.

Since the world war, many a well meaning person in this country has tried to do away with this minimum on the ground that criticisms of existing conditions and discussions of possible changes are subversive of democracy and consequently unamerican. These persons either do not understand the implications of democracy, or have no confidence in the ability of the people to exercise their constitutional rights. If the people have to be sheltered and protected against contact with new ideas, good or bad, they can not be in a position to govern themselves. Censorship of ideas and true democracy are incompatible and mutually exclusive.

The road of progress ever penetrates into new and unknown territory. Exploring, surveying, blazing, felling trees and clearing the underbrush are just as essential for the extension of the road as laying the foundation and putting on the top dressing of the road in the cleared sections. It serves no useful purpose for those engaged in the later stages of the construction to call the others idlers or destroyers.

Another popular misapprehension which deserves our attention relates to the function of parties in political progress. We are not interested here with the merits of party government compared with other democratic forms of government. Given the party form of government, what is the proper conception of the function of parties? That is the question which we want to consider. Persons occupying exalted position in one of our major political parties have attacked independent organizations such as the League of Women Voters on the ground that political influence should be exercised only by bodies organized explicitly as political parties.

One might just as well claim that all research and education in the theory and application of electricity must be carried on through duly incorporated electrical companies, preferably through the Westinghouse and the General Electric companies. Electrical stock companies are organized for the express purpose of making money for their owners and not to carry on research and educational work. Their function is to supply the country with electrical machinery. If they do a little research work it is only to keep one step ahead of their competitors. Education means to them the training of the public to buy their wares. The main body of research in electricity has been carried on in the study room of the mathematical physicist and in the laboratory of the experimental physicist. Education has been and will always be the work of non-money-making institutions. The situation in government is analogous. The object of parties is to win political campaigns. Their function is to administer the country in the way the majority of the people think it should be administered. No party is qualified, or can afford, to carry on research necessary for political progress, or to teach the public the results of recent researches. Political education and research work in government must be carried on, as we are now organized, by individuals and by non-partisan organizations, if we are to have progress in this field.

III

So far our discussion has centered mainly upon the contrast between the spirit and attitude which prevails in science, on the one hand, and in politico-economics, on the other. We will now consider the scientific method of progress and see in what way it might be applied to questions of government and economics.

The scientific method of progress consists of two complementary processes. In one of the processes facts, collected through experience, observation and experiment, are used to obtain relations among measurable magnitudes such as length, time intervals, forces, etc. These relations are then assembled into an ideal structure. Geometry and the science of electrodynamics are examples of such ideal structures. In the second process these ideal relations become guides for the proper handling of known data and for the discovery of new facts and relationships. The first is the process of the building up of a theoretical system; the second is the process of the application of the theory. The two together form the wheels upon which science progresses. Without theory practice reduces to the rule of thumb. Without the facts obtained by practice theory becomes unmanageable.

There are two important details connected with the scientific method which deserve special mention. First, the scientist defines

as clearly and unambiguously as he possibly can every word which represents an important concept. Secondly, as his ideal structure grows by the discovery of new facts and relationships, he takes scrupulous care to make it more stable and harmonious by rearranging, by altering and, if necessary, by discarding certain parts.

The work of the students of the foundations of geometry of the nineteenth century and Einstein's achievements are examples of how the scientist searches even the deepest and most solid parts of the foundations of his ideal system for flaws, for weak points, for incongruities. For 2,500 years Euclidian geometry had stood the test of experiment and of the strictest logical thinking of the greatest human minds. Yet the geometrician was not satisfied. Is the postulate of parallelism an independent assumption or is it a consequence of the other axioms of geometry? That was the question which he asked relentlessly and for which he finally obtained an answer that brought with it new systems of geometry. The Newtonian conceptions of space and time formed the solid foundation of the marvelous structure which science has erected during the last three centuries. Yet Einstein asked himself "Are these conceptions of space and time true to nature?" and found an answer which opened a new world for science and philosophy.

In the fields of economics and government there is nothing comparable with the two complementary processes which form the scientific method. There is too much operation in these fields, and too little science, too much of carpentry and too little of geometry, too many operators of electrical machinery and too few who understand electrodynamics. Students of government and of economics appear to be more interested in the operation of the present machinery of organization than in the creation of new and more efficient machinery, or in the building up of an ideal structure with which existing organizations could be compared.

Have the students of the foundations of government (if such exist) examined the famous trio of liberty, equality and fraternity to see whether these foundations of democracy are compatible with each other and with nature, or whether the traditions, the laws and the conventions of democracy are in consonance with its basic principles? Is it possible to have both liberty and fraternity? Is there equality in nature? In what way should liberty be defined so as to bring it into harmony with the responsibilities and the consequent constraints implied by the postulate of the brotherhood of man? How should democracy be organized so as to satisfy the aspirations of man expressed in the term "equality?"

The foregoing questions could be answered and a scientific

theory of democracy could be developed if a group of brilliant scientists could be induced to devote ten years of their lives to the study of democracy in government and in industry, and if they could be organized for concerted effort. The group would have the following objectives.

First: To discover and to formulate a set of postulates, or principles, which are necessary and sufficient for the building up of a theory of democracy, having regard to the adaptability of the theory to life and of the postulates to the theory.

Second: To erect upon the postulates adopted as foundations the theoretical structure of an ideal democracy which will be rational and self consistent.

Third: To draw up a working plan by which our actual democracy could be approached by successive approximations to the ideal, say, during the next one hundred years.

The experts working for the first objective would be mainly mathematicians trained in the foundations of geometry and logicians like Bertrand Russell. The group drawing up the working plan would contain natural scientists, engineers, psychologists, economists and men of practical experience in government and industry. The group working for the second objective would contain all types of experts.

I do not want to give the impression that the foundations and the superstructure of the theoretical democracy and the plan for its materialization could be final. For a scientist finality has no meaning. The theory as well as the working plan would be modified and improved constantly in the light of new experience. Yet I am confident that even the first draft of the theory would be a good enough model for the irrational and inefficient existing systems to copy. Nor am I under the illusion that there is a moderate chance of the working plan being adopted by any country. The usefulness of the scheme which I am proposing would be increased if the plan could be adopted. Beyond that the question of its adoption is not relevant to the scheme. Most of the researches in mathematics and in natural sciences are carried on with little or no expectation of practical application. Some of the most useful applications of science to industry have come about indirectly from researches which had appeared to have no possibilities of practical application. The most useful engine ever invented is Carnot's ideal engine which can not be constructed except in idea. If direct application were the deciding factor in the development of mathematics and of natural sciences we should still be savages. The scheme I have suggested would have its greatest usefulness through its indirect reflection upon society.